

Article XXIX. — FOSSIL PARASITIC AND PHYTOPHAGOUS HYMENOPTERA FROM FLORISSANT, COLORADO.

By CHARLES T. BRUES.

Several months ago I received through the kindness of Professor T. D. A. Cockerell and Professor Wm. M. Wheeler, a collection of fossil Hymenoptera from the famous tertiary lake basin at Florissant, Colorado. With the exception of a single Oryssid, only parasitic forms were included in the sending, and these constitute the basis of the present paper.

All represent species not hitherto described, but this is not surprising as the Florissant fauna belonging to these groups has never been exploited, except for a series of seven species described by Scudder in his Tertiary Insects.¹

The present collection contains about 25 specimens, and only one, or possibly two species are represented by more than a single example. Nine species are well enough preserved to be placed generically, and only one is not assignable to any described genus.

From such a fragmentary series it is impossible to draw any general conclusions regarding the relation of the fossil parasitic fauna of Florissant to the present-day Hymenoptera of the same region, but the similarity among the few species I have seen is quite close, and will warrant the assumption that the general character is likewise similar. This agrees with the conclusion reached by Cockerell² from a study of the bee fauna, rather than with the opinion of Scudder that the insects of Florissant show decidedly southern affinities. Many of the genera of parasitic Hymenoptera are very widely distributed, however, and too much weight must not be placed on the slender evidence which the present collection affords.

In the following account generic names have in some cases been applied of necessity *sensu lato* as the finer discriminations applicable to recent species are usually impossible in studying fossils.

The entire collection, including the types, is in the American Museum of Natural History.

ORYSSIDÆ.

Lithoryssus gen. nov.

Small species resembling *Oryssus* in general habitus, but with the ovipositor

¹ Report U. S. Geological and Geographical Survey of the Territories, Vol. XIII (1890).

² Fossil Hymenoptera from Florissant, Colorado. Bull. Mus. Comp. Zool. Harvard Coll., Vol. L. No. 2 (1906).

projecting beyond the tip of the abdomen for a distance nearly equal to the length of the abdomen. Wings with only one closed submarginal cell, a second closed one perhaps very faintly indicated by a transverse vein. The humeral area apparently undivided. Antennæ 8- or 9-jointed, the flagellar joints equal in length or nearly so, except the first. Abdomen wider than the thorax, consisting of seven nearly equal segments. Type *L. parvus* sp. nov.

The specimen upon which this genus is founded cannot be placed in any recent genus and I have been compelled to define a new one for its reception. It would seem to fall into the subfamily Oryssinæ as defined by Konow¹ where it comes nearest to *Oryssus*, from which it differs as pointed out above.

Lithoryssus parvus sp. nov.

Female. Length 3.5 mm. Black, the abdomen brownish or rufous. Wings with a brownish tinge. Antennæ 8- or 9-jointed, more probably 9, the apical

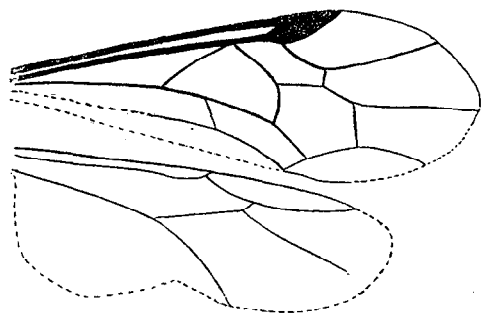


Fig. 1. *Lithoryssus parvus* sp. nov. Wings. Dotted lines are restored.

five or six joints nearly equal in length, each about two and one-half times as long as wide, the first (?) flagellar joint longer and narrowed basally. Wings with the costal and subcostal veins thickened, not united at the root of the wing; submedian cell much longer than the median. First submarginal cell a little more than two times as long as high, narrowed at the tip; second submarginal open, receiving the recurrent nervure one-fourth of the way from the first transverse cubitus to wing tip. Second transverse cubitus perhaps feebly indicated, but not distinct.

Described from one specimen seen in dorsal aspect, collected in a bank facing north, three-quarters of a mile southwest by west of Florissant, Colorado.

[*ICHNEUMONIDÆ*

SUBFAMILY CRYPTINÆ.

Mesostenus modestus sp. nov.

Length 5.5 mm. This is a rather poorly preserved specimen, but is I think surely a member of the tribe Mesostenini on account of the wing venation and the characteristic tubercle at the lateral metathoracic angle. This latter is shown very distinctly; it is rather pyramidal and projects somewhat laterally. The anterior wing is well preserved. Stigma about one-third as wide as long

and almost one-half as wide as the marginal cell. Basal nervure slightly curved, the median and submedian cells of equal length. Subdiscoidal nervure of anterior wing broken just below the middle. Areolet triangular in position, but open behind; the second recurrent nervure curving toward the base of the wing, above received by the cubitus as far beyond the transverse cubitus as the length of the transverse cubitus, or a little further. Third discoidal cell apparently open at the extreme tip. The tips of the antennæ are broken off, but the first few flagellar joints are about two or two and one-half times as long as wide. The abdomen is about as long as the head and thorax together, the ovipositor stout, apex missing.

One specimen from the north end of Fossil Stump Hill, Florissant, Colorado.

Although not especially well-preserved, I think this belongs undoubtedly either in the genus *Mesostenus* or one of its near allies. It apparently lacks the bright colors characteristic of many of our recent species of *Mesostenus*, the head and thorax being uniformly black and the abdomen fuscous. The legs are more of a honey-yellow

SUBFAMILY PIMPLINÆ.

Acenites defunctus sp. nov.

Female. Length 5 mm. Antennæ with about 22 joints, slender, involute, reaching about to the tip of the abdominal petiole. Mesonotum with parapsidal furrows, or at least the middle lobe is raised anteriorly above the humeri. Metanotum with a transverse carina, and rather distinctly areolated, sharply declivous behind. Pleuræ with the vertical sutures crenulated. Abdomen strongly enlarged toward the tip, the ventral valve prominent, extending considerably beyond the tip of the abdomen. First abdominal segment long, equalling the second to fifth together, straight, gradually enlarged toward the tip. Second to sixth segments nearly equal, the third to fifth much thicker dorsoventrally, being two and one-half times as high as long; sixth rounded above at the tip. Ovipositor apparently about half the length of the abdomen although it is too faintly preserved to be made out distinctly and may possibly be much longer. Wings with the recurrent nervure received beyond the first transverse cubitus, the areolet absent. Submedian cell barely longer than the median. The wing of the type specimen is broken basally, so that the shape of the first basal cell shown in the drawing is distorted.

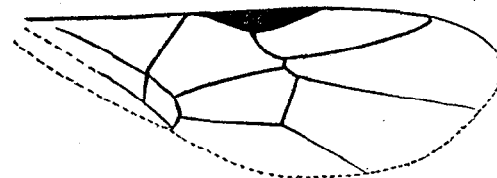


Fig. 2. *Acenites defunctus* sp. nov. Fore wing. Dotted lines are restored.

Described from one specimen from a bank facing north, three-fourths of a mile southwest by west of Florissant, Colorado.

¹Term. Füz., Vol. 20, p. 602 (1897), and Gen. Insectorum, Fasc. 28, p. 9 (1905).

The species is a typical representative of the tribe Acœnitini as defined by Ashmead¹ but its place in the genus *Acanites* is less certain the presence of parapsidal furrows being doubtful as the specimen is seen in lateral aspect. However, there seems to be nothing to exclude it and I have placed it here at least provisionally. Although much smaller it resembles our recent native species of the allied genus *Arotes*, from which it differs in neuration.

A fossil species of this genus has already been described as *A. luridus* by Giebel, from the Mayencian of Radoboj in Croatia.

Rhyssa petiolata sp. nov.

Female. Length 7 mm. Ovipositor 9 mm. Body rather roughly sculptured except the four apical abdominal segments. Antennæ long and slender, not well preserved. Mesonotum obliquely striated on each side of the median line. Metathorax areolated. First abdominal segment four times as long as thick, its sides sub-parallel, with a deep groove and carina on each side below, its surface rugulose; second segment about as long as the first, coriaceous; third, fourth, and fifth increasing in size (seen from the lateral aspect), sixth and last small, triangular. Ovipositor issuing apparently at the tip of the fifth (not sixth) ventral segment. Distinctly longer than the body. Hind legs long, their femora rather slender. Wings very poorly preserved, the areolet apparently open.



Fig 3. *Rhyssa petiolata* sp. nov. Abdomen and ovipositor

One specimen, lateral aspect, both impressions, from a bank facing north, three-quarters of a mile southwest by west of Florissant, Colorado, collected by Mrs. Wilmatte P. Cockerell.

The habitus of this species is very like that of *Rhyssa*, but the differences in the length of the basal abdominal segments may be of generic importance. Unfortunately the wings are very poorly preserved.

Pimpla appendigera sp. nov.

Female. Length 7 mm. Ovipositor 5.5 mm. Head turned so as to show the dorsal aspect, about three times as wide as thick antero-posteriorly. Antennæ 30- or 31-jointed, the basal flagellar joints about three and one-half times as long as thick, decreasing in length, so that the joints near the middle are two times as long as thick, from thence narrower and a little shorter. All joints, especially the apical ones, are distinctly strigose or finely longitudinally fluted. The antennæ are about three-fourths as long as the body. Mesonotum apparently smooth and without parapsidal furrows. Propleuræ coarsely rugulose, mesopleuræ smooth, finely punctured below. The metathorax appears to be

coarsely rugose and its spiracles are round. The legs are shaped as in *Pimpla conquisitor* Say: four posterior femora dark at base and apex and pale medially; their tibiæ pale except at apex; tarsi dark. Abdomen as long as the head and thorax, apparently with a granular sculpture; sessile, the first, second, and third segments subequal in length, the second a trifle longer than the third. The abdomen widens out sickle-shaped toward the apex, but this is probably due to compression of the rock. The ovipositor issues near the middle of the fifth segment, there being six visible segments, the sixth long and probably really composed of more than a single segment. Along the sides of the petiole there is a carina bordering a deep submarginal depression. Wings with the submedian cell a little longer than the median. Discoidal cell with a stump of a vein. Areolet subtriangular, small, subpetiolated.

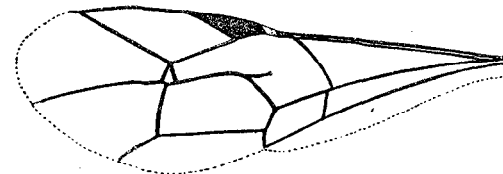


Fig. 4. *Pimpla appendigera* sp. nov. Fore wing. Dotted lines are restored.

One well preserved specimen from the south end of Fossil Stump Hill, collected by Mr. S. A. Rohwer.

SUBFAMILY TRYPHONINÆ.

Orthocentrus primus sp. nov.

Length 4.5 mm. Probably a female. Dark colored, with yellowish wings and brownish yellow tibiæ and tarsi. Antennæ stout, the middle flagellar joints about quadrate, or barely wider than long. Head a little higher than thick, its surface smooth. Thorax twice as long as high, the mesonotum smooth; metathorax areolated, or at least with a distinct transverse carina. Abdomen sessile, clavate, rounded at the tip, one and one-third times as long as the head and thorax together; the first segment a little over twice as long as high at the tip, the second, third, and fourth shorter, subequal. Ovipositor not exerted. Legs and coxæ very stout, the posterior femora fully one-third as thick as long, but this may be due in part to pressure; posterior tibiæ scarcely longer than their femora; their tarsi thickened. Wings with only the basal neuration preserved, the submedian cell a trifle longer than the median, the transverse median nervure strongly oblique. Stigma rather broad, elongate-triangular. Marginal cell pointed at the tip, the radius evenly curved, without sharp angles. Areolet apparently indicated but open behind, the cubito-discoidal nervure but slightly curved.

Described from one impression of a single specimen from a bank facing north, three-quarters of a mile southwest of Florissant, Colorado, collected by Mr. S. A. Rohwer.

The specimen is not especially well preserved, but shows in the full lateral aspect with the characteristic habitus and stout legs of the tribe Orthocentrini. Its place in the genus *Orthocentrus* is less secure.

but the only visible disagreement is in the short flagellar joints which would perhaps indicate it as a species of *Atrometus*; in doubt, I have placed it in the typical genus of the tribe.

BRACONIDÆ.

SUBFAMILY RHOGADINÆ.

Rhogas tertiarius sp. nov.

Female. Length 4.5 mm. Head, thorax, and first abdominal segment black, remainder of the abdomen rufous or ferruginous. Antennæ and legs not preserved. Head almost as wide as the thorax, the sides of the face, clypeus, and mandibles apparently ferruginous, the tips of the latter and the palpi black. Mesothorax showing the parapsidal furrows posteriorly although they are not preserved in front. First abdominal segment showing the median carina quite distinctly and some longitudinal striate sculpture. First segment about quadrate, the second and third subequal, the third a little the longer, together three times as long as the first; fourth narrower, less than one-half as long as the third, rounded at tip. The ovipositor can be seen marked upon the third and fourth segments, due no doubt to pressure; it is not visibly exerted. Wings hyaline, the venation much as in *Rhogas terminalis* Cress. Marginal cell pointed at the tip, the second abscissa of the radius twice as long as the first and three-fourths the length of the third. First abscissa of the cubitus slightly longer than the second, which is about twice the length of the second transverse cubitus. Submedian cell of anterior wing longer than the median by the length of the second abscissa of the radius.

Described from a single specimen from Florissant, Colorado.

SUBFAMILY MICROGASTERINÆ.

Microgaster primordialis sp. nov.

Female. Length 3 mm. Black, the abdomen ferruginous, darker at the tip. Wings tinged with brown, the stigma brown. Antennæ fuscous, rather stout, the flagellar joints not over twice as long as thick. Ovipositor slightly projecting. Front wing preserved only in part; stigma subtriangular, the parastigma distinct. First discoidal cell with a short petiole above where it connects with the parastigma; areolet present, fully closed.

Fig. 5. *Microgaster primordialis* sp. nov. Part of fore wing.

Described from one specimen from a bank facing north, three-quarters of a mile southwest by west of Florissant, Colorado.

Although the specimen is only in part preserved, its systematic position is unmistakable, and the bicolored body will make it readily recognizable.

BELYTIDÆ.

Pantoclis deperdita sp. nov.

Female. Length 5 mm. Body shining black, the antennæ probably brown. The antennæ are not well enough preserved to count the basal joints accurately but are probably 15-jointed, the apical five joints forming a loose submoniliform club; the first two joints of the club are moniliform, while the last two are wider; the joints toward the middle of the flagellum about one and one-half times or twice as long as thick. Prothorax visible from above although short. Mesonotum almost as long as the scutellum and metathorax together, with deep and complete parapsidal furrows. Scutellum with a deep transverse furrow at the base which is fluted longitudinally on the bottom; posterior margin of scutellum crenately punctured, the postscutellum apparently somewhat tuberculate. Metanotum with three parallel longitudinal carinæ dividing it into four equally wide areas; the posterior angles acute. Abdomen as long as the head and thorax, the petiole as long as the metathorax and scutellum together; second segment almost covering the rest of the abdomen, longitudinally striate on its basal fifth; following segments together one sixth as long as the second, but their boundaries are not visible in the specimen. The legs are not preserved. Front wings with a small basal cell distinct, and a small closed marginal cell which is scarcely longer than the stigma-like marginal vein.

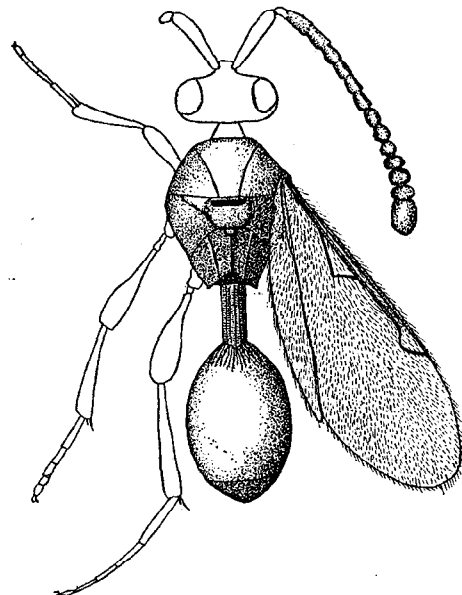


Fig. 6. *Pantoclis deperdita* sp. nov. Restored parts are unshaded.

Described from one specimen in a beautiful state of preservation, found in a bank facing north, three-quarters of a mile southwest by west of Florissant, Colorado.

This species agrees in all visible features with the species of this widely distributed recent genus and undoubtedly belongs here, being closely related to several present day forms from our region.

BETHYLIDÆ.

There is one specimen of what is evidently a member of this family [Dec., 1906.]

but it is too badly preserved to place with any degree of certainty. The neurulation is different from that of any genus with which I

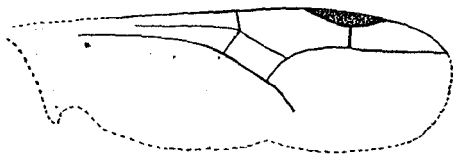


Fig. 7. Problematic Bethyloid. Fore wing. Dotted lines are restored.

am familiar. In venation it seems to approach *Eupsenella* Westwood, but there is only a single submarginal cell. The antennal joints are short, but little longer than wide. The form of the marginal

cell is very ant-like, but the antennæ are evidently not geniculate.

The single specimen, (see fig. 7) which must represent a new genus, is from the south end of Fossil Stump Hill, Florissant, Colorado.

Public Museum, Milwaukee, Wis., October 3, 1906.